

YAMAGUCHI, et al., 10/071,097
08 August 2005 Office Action
Responsive to 07 March 2005 Office Action

520.41158X00 / NT0566US
Page 7

REMARKS

This paper is responsive to any paper(s) indicated above, and is responsive in any other manner indicated below.

PENDING CLAIMS

Claims 1-11 were pending, under consideration and subjected to examination in the Office Action. Appropriate claims have been amended, canceled and/or added (without prejudice or disclaimer) in order to adjust a clarity and/or focus of Applicant's claimed invention. That is, such changes are unrelated to any prior art or scope adjustment and are simply refocused claims in which Applicant is present interested. At entry of this paper, Claims 2-10 will be pending for further consideration and examination in the application.

ALLOWED CLAIMS

Claim 10 has been allowed in the application, as indicated within the section number "5" on page 6 of the Office Action. Applicant and the undersigned respectfully thank the Examiner for such indication of allowable subject matter.

REWRITTEN ALLOWABLE CLAIMS

Claims 5-6 have been indicated as being allowable if rewritten, as indicated within the section numbered "6" on page 6 of the Office Action, and at least appropriate base ones of such claims have been so rewritten. Applicant and the undersigned respectfully thank the Examiner for such indication of allowable subject matter.

YAMAGUCHI, et al., 10/071,097
08 August 2005 Office Action
Responsive to 07 March 2005 Office Action

520.41158X00 / NT0566US
Page 8

REJECTION UNDER 35 USC '102

The 35 USC '102 rejection of claims 1-4 and 7-9 as being anticipated by Munesada et al. (U.S. Patent 5,805,728) is respectfully traversed. However, such rejections have been rendered obsolete by the present clarifying amendments to Applicant's claims, and accordingly, traversal arguments are not appropriate at this time. However, Applicant respectfully submits the following to preclude renewal of any such rejections against Applicant's clarified claims.

All descriptions of Applicant's disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the applied prior art, as previously submitted by Applicant in any form, are repeated and incorporated hereat by reference. Further, all Office Action statements regarding the prior art rejections are respectfully traversed. As additional arguments, Applicant respectfully submits the following.

Unrelated to any prior art rejection, claim 1 has now been canceled without prejudice or disclaimer, thus rendering this rejection of such claims obsolete at this time. Patentability of remaining ones of the rejected claims are supported as follows.

In order to properly support a '102 anticipatory-type rejection, any applied art reference must disclose each and every limitation of any rejected claim. The applied art does not adequately support a '102 anticipatory-type rejection because, at minimum, such applied art does not disclose (or suggest) the following discussed limitations of Applicant's claims.

Applicant's disclosed and claimed invention is directed toward circuit pattern inspection arrangements providing improvements in ways for quantitatively

YAMAGUCHI, et al., 10/071,097
08 August 2005 Office Action
Responsive to 07 March 2005 Office Action

520.41158X00 / NT0566US
Page 9

evaluating the shape of edges. One criteria Applicant has found advantageous in circuit pattern inspection is in looking at correlations between edges.

Accordingly, Applicant's invention includes arrangements for calculating a correlation of fluctuations in, for example, the right and left edge positions of one line, a coefficient of correlation, and dependency on the threshold of the coefficient of correlation, and then drawing viewgraphs based on the calculation results. Consequently, whether the directions of roughness of the right and left line pattern edges are (1) the same direction (FIG. 1), (2) opposite to each other (FIG. 2), or (3) at random, and whether the types of the roughness changes in the depth direction or not, can be made clear via illustration.

As simplistic examples, FIG. 1 shows a case where the width of the line is constant but the line itself is wavy. FIG. 2 shows a case where the right and left edges of the line are synchronous, but fluctuate in the opposite directions different from FIG. 1. When there is the tendency of (1), the correlation between the fluctuations in the right and left edge positions is positive. When there is the tendency of (2), the correlation between the fluctuations in the right and left edge positions is negative. When the right and left edges fluctuate independently, there is no correlation.

In terms of distinguishing claim language, at minimum, independent claim 2, for example, explicitly claims "a step of displaying correlation between edge roughness shapes of different line edges". Applicant's FIG. 10, for example, is an example diagram showing correlation between right edge roughness and left edge roughness in one line.

YAMAGUCHI, et al., 10/071,097
08 August 2005 Office Action
Responsive to 07 March 2005 Office Action

520.41158X00 / NT0566US
Page 10

Turning to rebuttal, it is respectfully submitted that Munesada et al., as a primary reference, does not disclose or suggest any type of arrangement displaying correlation between edge roughness shapes of different line edges. None of the other applied references cure this major deficiency with respect to the primary Munesada et al. reference. Office Action comments in support of the rejections, do not at all mention, and accordingly, do not address, the above important feature/limitations of Applicant's claims. Accordingly, it is respectfully submitted that the rejections are insufficiently supported by Office Action comments, and in fact, cannot be sufficiently supported in view of the deficiency of the Munesada et al. and other references as mentioned above.

In addition to the foregoing, the following additional remarks from Applicant's foreign representative are also submitted in support of traversal of the rejection and patentability of Applicant's claims.

The claimed invention, in claim 2, is characterized by including a step of detecting a set of edge points indicative of positions of line edges of the pattern in a two-dimensional plane from the two-dimensional distribution information by a threshold method, and a step of displaying correlation between edge roughness shapes of different line edges.

By this, the claimed invention can provide a circuit pattern inspection technology capable of converting evaluation of the shape of an edge, evaluating the edge shape quantitatively and promptly with high precision, and specifying the cause of occurrence of roughness systematically.

In contrast, Munesada, et al. discloses a method for measuring the position and slope of a specific edge line of a target object in which, as described on column

YAMAGUCHI, et al., 10/071,097
08 August 2005 Office Action
Responsive to 07 March 2005 Office Action

520.41158X00 / NT0566US
Page 11

6, lines 24-29, "based on this image data, i.e., the brightness information, the edge point detection means 9 detects and obtains coordinates of all points indicating a change from bright to dark in the scanning direction (or dark to bright if the scanning direction is opposite that shown in Fig. 2A), and outputs this data as the specific image data". Munesada, et al. does not disclose the above feature of the claimed invention, that is, "displaying correlation between edge roughness shapes of different line edges".

Munesada, et al. does not teach that a plurality of values are used as thresholds used for the threshold method as in claim 3, and calculating a spatial frequency distribution of the edge roughness shape obtained as in claim 4.

Furthermore, Munesada, et al. does not teach observing the sample and obtaining a two-dimensional intensity distribution of secondary electrons or reflected electrons, and calculating a shape of roughness of an edge of the line pattern from the two-dimensional intensity distribution as in claims 7-9.

In conclusion, the claimed invention is sufficiently distinguishable from Munesada, et al. Thus, the §102 rejection can be overcome, and the §103 rejection is cleared since the rejected claim 11 is cancelled (without prejudice or disclaimer).

As a result of all of the foregoing, it is respectfully submitted that the applied art would not support a '102 anticipatory-type rejection of Applicant's claims. Accordingly, reconsideration and withdrawal of such '102 rejection, and express written allowance of all of the '102 rejected claims, are respectfully requested.

YAMAGUCHI, et al., 10/071,097
08 August 2005 Office Action
Responsive to 07 March 2005 Office Action

520.41158X00 / NT0568US
Page 12

REJECTION UNDER 35 USC '103 - OBSOLETE VIA CLAIM CANCELLATION

The 35 USC '103 rejection of claim 11 as being unpatentable over Munesada et al. in view of Abboud et al. (U.S. Patent 6,433,348) is respectfully traversed, but the present cancellation of such claim (without prejudice or disclaimer) has rendered such rejection obsolete, and thus gratuitous traversal arguments concerning the rejection are omitted for brevity. Further discussions/arguments concerning such rejection are left for the future if/when appropriate. Based upon the following, reconsideration and withdrawal of such rejection are respectfully requested.

EXAMINER INVITED TO TELEPHONE

The Examiner is herein invited to telephone the undersigned attorneys at the local Washington, D.C. area telephone number of 703/312-6600 for discussing any Examiner's Amendments or other suggested actions for accelerating prosecution and moving the present application to allowance.

RESERVATION OF RIGHTS

It is respectfully submitted that any and all claim amendments and/or cancellations submitted within this paper and throughout prosecution of the present application are without prejudice or disclaimer. That is, any above statements, or any present amendment or cancellation of claims (all made without prejudice or disclaimer), should not be taken as an indication or admission that any objection/rejection was valid, or as a disclaimer of any scope or subject matter. Applicant respectfully reserves all rights to file subsequent related application(s) (including reissue applications) directed to any/all previously claimed

YAMAGUCHI, et al., 10/071,097
08 August 2005 Office Action
Responsive to 07 March 2005 Office Action

520.41158X00 / NT0566US
Page 13

limitations/features which have been subsequently amended or cancelled, or to any/all limitations/features not yet claimed, i.e., Applicant continues (indefinitely) to maintain no intention or desire to dedicate or surrender any limitations/features of subject matter of the present application to the public.

CONCLUSION

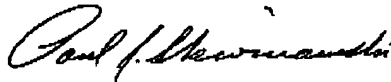
In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR 1.136. Authorization is herein given to charge any shortage in the fees, including extension of time fees and excess claim fees, to Deposit Account No. 01-2135 (Case No. 520.41158X00) and please credit any excess fees to such deposit account.

Based upon all of the foregoing, allowance of all presently-pending claims is respectfully requested.

Respectfully submitted,

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CONCURRENT SUBMISSIONS:

Petition for Extension of Time
Form PTO-2038